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THE GENESIS OF CROUPOUS PNEUMONIA.¹

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FROM being regarded as the result of a common cold to the more scientific opinion that it is the effect of a vegetable microörganism acting upon the animal economy; from being supposed to be a local inflammation to the view that it is a zymotic or essential fever, with pulmonary lesions, only the general causes of pneumonia are known, the specific being undetermined and a matter of conjecture. Under such conditions it is held the rightful duty of every observer along the line to cast his mite into the general treasury of such knowledge, that the causal agency may ultimately be disclosed, as has occurred in other diseases. The subject-matter of this paper is mainly constituted of personal observation and deduction, and is offered for what it is worth.

Is pneumonia a local disease or an essential fever? The question is rather antiquated and behind the times. As a local inflammation, attended by a symptomatic fever, its causes must be similar to those of any other local inflammation that may

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presented by the author



have been produced by any thermal, toxic, chemical, dyscrasic, or mechanical influence. Such a process is almost necessarily attended by fever, a resultant of absorption of certain materials from the affected part, whatever the cause, or arising from a nervous disproportion between the production and dissipation of heat. That a pulmonary inflammation should differ from one of some other organ is not clear, unless its course, effects, and morbid anatomy are distinctive and unless only certain causes always produce it to the exclusion of every other. Simple inflammations often follow slight causes when the bodily health has been lowered by some antecedent influence; the cause not abiding, the process soon subsides, the exudate being absorbed and the part assuming its normal state. So a fleeting or an abiding cause regulates the duration of any morbid process.

In local inflammations, the location and surroundings in which exudations occur are the parts upon which the causative agent had been most forcibly exerted, the previous condition of such a part being unknown and not observable. The course of such an inflammation will be influenced more by the condition of the individual than by its cause or causes, such condition determining the sthenic or asthenic form of the inflammatory process. Its duration is governed by the transient or continuous origin, and is classified by the anatomic changes observed in the part inflamed.

Acute inflammations, due to transient causes, usually end in resolution and restoration of function. If the general health have been greatly im-

paired previously or during the attack, the inflammation may result in suppuration or purulent infiltration.

Yet it is the rule, even in the unhealthy, for the inflammatory process to stop short of abscess. Purulent formations, when they do occur, are generally supposed to be of bacterial origin, as bacteria are believed by many to cause every form and grade of inflammation.

In severe, acute inflammatory states attended by pus-formation, special microorganisms are well known, and are always found to be present. It is true, also, that organisms having no known noxious influence, either by themselves or by their products, are generally abundantly present. It follows that most bacteria are innocuous and incapable of producing inflammation, either by their intrinsic harmlessness or by their inability to carry the citadel of fairly normal tissues. No doubt there are bacteria capable of producing every kind of inflammation, yet incompetent to excite suppuration. To me it has seemed that there must be some agency to weaken the normal resistance of tissues before these organisms can operate successfully, and that bacteria, as a causative agency, are secondary and considerably overestimated. Those usually found associated with pneumonia are present in health and are apparently harmless—for aught we know are benign in disease, as the inflammations produced from pure cultures usually differ from the primary.

In croupous pneumonia we have a typical fibrinous inflammation, beginning with congestion and serous exudation, resulting in a filling of the alveoli

and infundibula of the lobe affected with inflammatory products, or hepatization, and ending usually in resolution and occasionally in purulent infiltration. So far, the process resembles any other local inflammation. In its course, duration, character, and termination, it is in some respects analogous to specific diseases; in others the analogy is quite lost. That some cases are wholly specific, we believe. Some authorities,¹ however, assume that the disease has every feature of a zymotic disease in the same sense as cholera, typhoid fever, smallpox, etc., and that a house having bad ventilation and sanitation, and having been once infected by pneumonia-cocci, becomes their abode, because they find suitable soil for growth and multiplication, and are received into the system probably by inhalation, thereby causing frequent recurrences of the disease among the occupants. If this picture is absolutely accurate, then the same cleansing and fumigation is necessary in most houses after an attack of pneumonia as is needed after every case of smallpox, diphtheria, and allied diseases. The crowded tenement-houses of cities no doubt furnish such instances, but in the country and smaller towns, in the writer's experience, nothing of the kind has been encountered. Indeed, this seems to me an extreme view, because poor ventilation and bad sanitation in their entirety have often been found, while the infectious character of pneumonia has not been observed.

If pneumonia is infectious or contagious, then all that I have seen in over seventeen years has been of the sporadic variety—quite a different experience

¹ Keating: *Dis. Children*, vol. ii, p. 588.

from that of other infectious maladies. I have seen typhoid fever and diphtheria attack one member of a family after another ; I have seen several stricken at the same time ; yet nothing of the kind has been observed in regard to pneumonia. Were this view the usual experience of physicians everywhere, the specific character of pneumonia would have demonstrated itself long ago, as is daily demonstrated by zymotic diseases in every clime.

As telling against the zymotic nature of pneumonia, compared with typhoid fever : The former has been observed in the same individual a number of times ; the latter but once. Pneumonia leaves the individual prone to subsequent attacks ; whereas typhoid fever appears to confer immunity. This tendency to other attacks of pneumonia makes it resemble diphtheria, but, unlike that disease, it is not contagious. Then, no prodromal period has been observed, as in zymotic disorders, the onset being sudden. The course was generally severe and always short and not followed by sequelæ, as in typhoid fever, measles, diphtheria, etc. Pneumonia terminated by crisis, save in cases ending in purulent infiltration or abscess ; in these few, if death did not soon take place, recovery was retarded, as in other purulent formations.

I do not remember a case terminating by lysis ; and yet a critical ending in zymotic disease has been the exception—indicating the gradual elimination of the poison, or rather, perhaps, the return of the bodily resistance to bacterial infection. Inasmuch as we are taught that pneumonia is wholly a specific fever, I have often asked myself, What is it that de-

stroys the poison so quickly and so thoroughly? Is this poison deposited in the exudate, and thereby rendered innocuous—a quarantine established by Nature for her own protection? I cannot fathom it.

To myself, not looking at the question from a bacterial standpoint, it has appeared that crisis occurs in two ways: 1. In all favorable cases, in from three to seven days, there is sufficient discharge or drainage to secure resolution, just as I have seen slight wounds that some good-souled mother had hermetically sealed by adhesive plaster that prevented a small amount of pus escaping, followed by chill, fever, and delirium, that terminated as soon as the plaster was removed and drainage was established. 2. The cause that excited the inflammation exerted its influence for but a short time, the resulting disturbance being the effects of an agent that acted traumatically and then withdrew, leaving a simple exudation.

The fact that the encapsulated coccus of Fraenkel has been found in the tissue of pneumonic lungs in 92 per cent. of cases examined is certainly inconclusive, because that germ is always present in the saliva of healthy individuals, and, for aught we know, in the lungs also; beside, their absence in even less than 8 per cent. renders the argument worthless. The character played by the pneumonia-coccus of Friedländer as an exciting cause of those pneumonias terminating in suppuration is unknown, but certainly the conditions favorable to the formation of pus are abundant, just as they are in pleuritis, hepatitis, and nephritis.

Another objection to the conception of the specific

nature of pneumonia is that the disease is frequently aborted by antiphlogistic treatment, a rather infrequent result in zymotic diseases. I do not remember having seen a case of specific illness aborted, but I have seen cases prevented. At a meeting of the Philadelphia County Medical Society, April 13, 1892,¹ Dr. Hiram Corson read a paper on "Pneumonia and Its Treatment," in which he advocated venesection as a controlling remedy of the highest order, and states this to be the result of "over sixty-five years of careful, anxious observation." The results of his long experience are worthy of consideration, even if we no longer bleed.

On every hand appear the opinions of different observers as to the specific or non-specific nature of pneumonia. It appears that the idea of the zymotic origin of pneumonitis is widely diffused and gaining ground, and they that cannot see the way so clearly are in the background and perhaps moss-grown, not having given bacteriology as full study as it deserves. These fossils, however, admit the specific origin of known zymotic diseases.

In my own experience the immediate causes of pneumonia are few. Common cold is not one of them, for were this a cause pneumonitis would be wondrously prevalent when colds are abundant. On the other hand, continued exposure and exertion during seasons of the year having great thermometric range and conditions connected therewith would, in certain individuals, excite pneumonia; while others similarly exposed would escape.

I have seen the "dust chill" experienced by

¹ Journal Am. Med. Assoc., May 14, 1892.

farmers after threshing in the heat followed by as typical a pneumonia as that consequent upon a prolonged drunken spree, while others similarly engaged entirely escaped. I have seen pneumonia as fully developed secondarily to chronic cystitis, arthritis, uremia, measles, etc., as it has been seen following vicious or licentious habits, yet many persons similarly exposed remained exempt. I have seen pneumonia as complete following the accidental inspiration of a portion of hazel-shell into the right bronchus, where it remained a few hours, being expelled by violent coughing ; while contrarily, a child had a coiled piece of tin in the same situation for twenty-six days, without such effect. I have seen pneumonia follow the inhalation of dust by sawyers, the small particles being probably aspirated into smaller tubes and alveoli, a crisis being favored by expectoration. I have seen pneumonia follow unusual exposure to cold and wet in conditions of hunger, debility, or intoxication, while some persons could withstand similar exposure with impunity, so far as pneumonia was concerned.

Sex makes no difference under similar depressing influences, and persons of an age anywhere from six months to forty years, especially in infancy and youth, are most liable to the disease. Pneumonia has been observed in early life, before a vigorous constitution is developed and when tendencies are uppermost ; or in adult age, when the circumstances surrounding an active stage or when depressing agencies brought to the surface the latent tendencies of the individual. The degenerations and waning powers of old age have been nearly the same in effect as infancy or youth.

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I have seen pneumonia in the wake of bad hygiene, poor sanitation, enervating habits, and overwork, and yet conditions the reverse of these were found inadequate to prevent it if some physical debility existed. To me it appears that some individuals and certain families are more disposed to this form of inflammation of the lungs than others, and that three factors alone are necessary to produce a pneumonia: 1. A predisposition or tendency. 2. Loss or lack of normal tissue-resistance. 3. An exciting cause. The result would be a pneumonic inflammation, alteration of the blood, fever and nervous phenomena.

1. Tendency may depend upon a previous pneumonia, dyscrasia, or family history of pulmonary weakness, favored by depressing, weakening habits and pursuits, age and surroundings.

2. While all the associated predisposing conditions and influences act on all alike, not all succumb to the development of pneumonia, because not in possession of essential predisposition.

3. The first two requisites being present, any exciting cause, be it dust, season, poisonous materials in the blood, microorganisms, or the manifold and diverse circumstances that tend to inflammation, would develop a pneumonia, its degree, course, and termination being influenced by the exciting cause: an inflammation not purely local nor yet bacterial or specific, but due to a systemic condition that permits many and diverse agencies to excite, rather than some other form of disease. It follows that a patient should be made and kept as aseptic as possible until the crisis is thoroughly established.

